

BASE PLATE WITH ELECTRONIC MODULE

**BACKGROUND OF THE INVENTION**

This invention relates to a base plate for the reception of at least one electronic module, whereby the electronic module is insertable and connectable through an opening or slot respectively within the base plate into said base plate, such as a part of the electronic module remains accessible from the insertion side or protrudes to the outside.

5 A base plate or face plate respectively will commonly be used for the construction of housings of hearing aids or hearing devices respectively, to which on one hand the shell, i.e. the external housing wall, and on the other hand the electronic elements are arranged.

10 A base plate with an opening will be used for instance for in-the-ear hearing devices, to which the shell will be attached. The attachment between the base plate and the shell adapted to the wearer of the hearing device is regularly made by adhesion or welding respectively or by

15 manufacturing of the entire housing for in-the-ear hearing devices by laser sintering or stereo lithography. The complete electronic of the device, preferably in form of a module, will be inserted or latched into the opening. The module comprises regularly integrated a battery compartment

20 as well, which comprises a battery cap pivotable arranged over an axis. The battery providing energy to the module may therefore easily be replaced. This replacement may be performed either by specialists or the wearer of the hearing device itself. The advantage of this construction

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lies in the fact that one unique module may be used for different, usually individually manufactured hearing devices, resulting in positive influence to the costs of the hearing device. Due to the integration of the axis of  
5 the battery cap in or at the module, all the forces caused by the manipulation of the cap, for instance by opening or closing of the cap, will indeed be transferred to the module. Those forces may on one side directly damage components of the module and on the other hand damage the  
10 current linkage between those components. Especially the contacts, conducting paths and wires of the module are very sensitive with respect to such mechanical force influences.

**SUMMARY OF THE INVENTION**

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It is an object of the present invention to provide a base plate for electronic modules to enable the modules to be easily accessible from the outside for insertion and exchange.

20 It is a further object of the present invention to provide a connection between the cap closing the remaining opening and the base plate such that no forces will be transferred onto the electronic modules.

In one embodiment of the invention there is provided a base  
25 plate for the reception of at least one electronic module, whereby the electronic module is insertable and connectable through an opening or slot respectively within the base plate into said base plate, such as a part of the

electronic module remains accessible from the insertion side or protrudes to the outside, whereby the base plate consists of recesses in the area of the opening according to the cross-section shape of the electronic module and that

5 in the area of the recesses guiding elements are provided, such as that the electronic module in its vertical end position in relation to the base plate is laterally insertable into the recess with respect to the opening. The modules thus may easily be inserted vertically from the

10 outside through the opening and finally laterally be moved to its final position by the arrangement of recesses provided laterally of the opening for the insertion of the electronic module or modules respectively and guiding elements. They are fixed in its final positions due to the

15 guiding elements and are all the same accessible from the outside or protrude to the outside due to the guiding elements.

In another embodiment of the invention, the opening provides of an essentially rectangular or square cross section, which shape will remain essentially the same after the insertion of the electronic modules, thereby merely reducing its width for a small amount. The inserted electronic modules consist preferably of a flat, straight surface towards the opening.

25 In a further embodiment of the invention, the guiding elements consist of slots and/or guiding faces provided in the base plate, to which accordingly shaped stop faces of the electronic module may be brought into contact. One module thereby may be inserted for instance in one recess

or more modules successively consisting of a shape accordingly not to build up an open slot between the several modules.

In a further embodiment of the invention, the opening  
5 consists of two oppositely arranged recesses each for an electronic module. Both of the electronic modules therefore may be inserted successively into the opening and laterally be moved into the respective oppositely arranged recesses. An opening will thereby remain between the two modules. A  
10 battery may for instance been inserted within this opening.

In a further embodiment of the invention, the electronic modules consist of electronic components such as amplifiers, switches, knobs etc. Each of those components may preferably be provided as detachable modules.

15 In a further embodiment of the invention, the electronic modules consist of contacts for the connection with a battery or accumulator. A battery compartment may thus easily be built directly by the use of two oppositely arranged electronic modules, into which a battery or  
20 accumulator respectively may be inserted to supply the module or modules respectively with power.

In a further embodiment of the invention, a cap is provided, closing the remaining slot of the opening after the insertion and shifting into the final positions of at  
25 least two oppositely arranged electronic modules. The cap thereby may further be detachable and/or pivotable connected to the base plate.

In a further embodiment of the invention, at least one bar is arranged transverse to the opening and overarching the opening embedded within the base plate.

In a further embodiment of the invention, at least one bar  
5 is arranged serving as pivotable fastening of the cap and as a guiding element for the electronic module. The bar is embedded advantageously within the base plate and the forces applied onto the bar will only be transferred to the base plate but not to the electronic modules. The bar  
10 further may serve as a stable guiding element and stop for the electronic modules.

In a further embodiment of the invention, if the cap for closing the opening will be connected with the bar, for instance by means of a pivotable plug-in connection, the  
15 cap may serve advantageously as receiver of the battery or accumulator. By rotating the cap into its closed position the battery may be brought into resilient contact with electrical contact tongues arranged at the corresponding electronic modules and thereby providing a power supply for  
20 the electronic modules. The forces caused by the pivoting of the cap will be transferred over the bar onto the base plate and absorbed by the base plate, without any influence of the forces onto the electronic modules.

In a further embodiment of the invention, the rim of the  
25 cap in its closed state covers at least partially the electronic module such as that said electronic module remains fixed at its final position.

In a further embodiment of the invention, a hearing aid or hearing device respectively with a base plate according to

claim 1 with a shell connected to the base plate enclosing the electronic module is provided. The inventive shape of the base plate is especially suitable for small dimensions occurring in the area of hearing aids or hearing devices  
5 respectively. The configuration is especially suitable for in-the-ear hearing aids in the field of miniaturization due to its simple design. A simple exchange of the battery may thus be ensured even by not trained persons, such as the wearer of the hearing device, without any damaging of the  
10 electronic modules by movements of the cap designed as battery compartment.

An economic building up of in-the-ear hearing devices may result by using standardized modules, as the shells has to be individually adopted according the different geometrical  
15 proportions of the wearers of the hearing devices. Those devices may be used further on in case of a defect due to the use of exchangeable electronic modules, as only the defective module hat to be exchanged.

In a further embodiment of the invention, the use of a base  
20 plate according claim 1 for hearing aids or hearing devices respectively is provided.

#### **DESCRIPTION OF THE DRAWINGS**

25 For purpose of facilitating and understanding of the invention, there is illustrated in the accompanying drawings a preferred embodiment thereof to be considered in

connection with the following description. Thus the invention may be readily understood and appreciated.

It will be shown in

Fig. 1 the view of an inventively shaped base plate  
5 with two inserted electronic modules;

Fig. 2 the view of both modules according figure 1  
without the base plate in its closed shifted position;

Fig. 3 the view according figure 2 in the final  
position; and

10 Fig. 4 the view according figure 1 from the inside of  
the base plate.

**DESCRIPTION OF A PREFERRED EMBODIMENT**

15 Figure 1 is showing the base plate 1 of a hearing device  
viewed from the outside. Two electronic modules 3 and 4 are  
inserted into the opening 2 and shown moved laterally into  
its final positions. An essentially rectangular opening  
remains further on between the two electronic modules 3 and  
20 4.

The opening is further on overarched by a bar 5, which bar  
is laterally hold or embedded respectively in the base  
plate 1. This bar 5 may for instance serve as pivotable  
attachment of a cap (not shown in figure 1) for closing the  
25 remaining opening. This cap may advantageously serve as  
holder for a button-shaped battery, which battery serves as  
power supply for the electronic modules.

Figure 2 now is showing the two electronic modules 3 and 4 without the base plate 1 for better overview purposes. Both electronic modules 3 and 4 are arranged practically adjoin each other. The modules 3 and 4 may be inserted in this  
5 position through the opening 2 of the base plate 1. Normally the one module 3 will be inserted first and the second module 4 further on, as the opening 2 only has a restricted width. The module 3 is already set in its laterally final position in the pictured position, apparent  
10 from its position relative to the as well pictured bar 5.

The second module 4 may now be moved laterally into its final position, as pictured in figure 3. Thereby the opening already shown in figure 1 will be formed between the two modules 3 and 4. This opening now just has the  
15 width to insert a battery between the two modules 3 and 4, which may be brought into conducting contact with contact tongues 6 or 7 respectively arranged advantageously on the two modules 3 and 4. The already mentioned cap may therefore be configured in well known matter as battery cap  
20 and fixing the battery and pivoting into its final position.

Figure 4 is showing the view of the position of both modules 3 and 4 according figure 2 from below of the base plate 1. The guiding slots 8 provided at the underside of the base plate 1 are visible, to which the stop faces of the module 4 will come into contact by its laterally movement. A further stop face 9 of the module 4 is visible as well, which comes into contact against a pin 10 in the area of the recess 11 of base plate 1 from the upper side.  
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The bar 5 serves as well as a guiding element or stop face respectively for the module 3. The guiding slot 8 and stop faces 9 respectively may consist of cam shaped elevations, which serves as snapping elements for the detachable

- 5 fixation of the electronic modules 3 or 4 respectively in its final positions.

The electronic modules 3 or 4 respectively themselves consist of electronic components preferably in modular shape, such as for instance a turn-switch module 12 or a

- 10 microphone module 13.